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New records of *Caloplaca, Hydropunctaria,* and *Verrucaria* from Turkey and Asia

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Abstract—Three lichen species—*Caloplaca oleicola*, *Hydropunctaria adriatica*, and *Verrucaria elaeina*—are described as new to Turkey and to Asia.

Key words—*Ascomycota*, *Corylus* sp., lichenized fungi, *Teloschistaceae*, *Verrucariaceae*

Introduction

The lichen biota of Turkey has received considerable attention in recent years. However, additional and more intensive lichenological field studies are needed for a complete lichen checklist of Turkey, because some regions of Turkey have not been investigated. Additional lichen records for Turkey are reported almost every year (e.g. Oran & Öztürk 2010, Arslan et al. 2011, Karagöz et al. 2011, Kınalıoğlu & Aptroot 2011, Vondrák et al. 2012, Aslan & Yazıcı 2013, Çobanoğlu et al. 2013, Yazıcı & Aptroot 2015, Şenkardeşler et al. 2016), including species new to science (e.g., Aptroot & Yazıcı 2012). In this paper we describe three lichen species: *Caloplaca oleicola*, *Hydropunctaria adriatica*, and *Verrucaria elaeina*, as new records for Turkey and Asia.

Materials & methods

The specimens examined are deposited at the herbarium of the Biology Department, Faculty of Science and Arts, Giresun University, Giresun, Turkey (GUB). They were studied with standard anatomical and morphological methods with the help of traditional chemical reagents (K, C, P, and I) used in lichenology (Smith et al. 2009).

Fig. 1. *Caloplaca oleicola* (GUB 2387): habit. Scale bar = 1 mm.

Taxonomy

Caloplaca oleicola (J. Steiner) van den Boom & Breuss,
Mycotaxon 56: 131. 1995. Fig. 1

Thallus thin, white or pale grey, smooth to very slightly rimose. Apothecia black, 0.3–0.7 mm diam., usually scattered, without a thalline margin, proper margin persistent, well-delimited and mostly glossy, disc slightly concave to flat. Epihymenium dark brown. Ascospores colourless, 10–15 × 5.5–9 µm, ellipsoid, septum 3.5–5 µm wide. Thallus C–, K–, KC–, PD–; apothecial proper margin and epithecium C–, K+violet-red, KC–, PD–.

Specimen examined: **TURKEY. Giresun:** Piraziz, Aydere village, 40°56′33″N 38°06′46″E, 156 m, on *Corylus* sp., 30 March 2006, leg. K.Kınalıoğlu, det. A. Khodosovtsev (GUB 2387).

Remarks—Our Turkish collection had apothecia and ascospores of a similar size to those described in the *Caloplaca oleicola* protologue (apothecia <0.6 mm diam, ascospores 10–16 × 6–8 µm with 5 µm septum; Boom & Etayo 1995).

Caloplaca oleicola is an uncommon corticolous species with black apothecia, previously found only on bark of *Alnus incana* and *Olea europaea* in Europe and North America (Boom & Etayo 1995, Goward et al. 1996); but in Turkey, we collected it from smooth bark of *Corylus* sp. in a shady and humid hazelnut garden. This is the first report of the species from Asia.

Caloplaca oleicola is clearly distinguished from *C. servitiana* by its thin white thallus and lack of a thalline exciple (Vondrák et al. 2010).

Fig. 2. *Hydropunctaria adriatica* (GUB 2388): habit. Scale bar = 1 mm.

Hydropunctaria adriatica (Zahlbr.) C. Keller & Gueidan,
Taxon 58(1): 194. 2009. Fig. 2

Thallus epilithic, superficial, shiny black. Perithecia scarce, prominent, concolorous with thallus, globose, 0.3–0.5 mm in diam. Ascospores ovoid, oblong, 12.5–17.5 × 6–8.75 µm. Pycnidia not observed. Thallus and apothecia C–, K–, KC–, PD–.

Specimen examined: **TURKEY. Giresun:** Keşap, Değirmenağzi village, sea shore (mostly intertidal zone), 40°58′20″N 38°37′23″E, 1 m, on siliceous rock, 11 April 2010, leg. K.Kınalıoğlu, det. A. Orange (GUB 2388).

Remarks— Our Turkish sample is distinguished from the European samples by its substrate preference, its smaller apothecia, and somewhat bigger ascospores; European material had apothecia 0.45–1 mm in diam and ascospores 12–15 × 7.5–8.5 µm (Zschacke 1933–34).

This poorly known species was previously found on calcareous rocks splashed by seawater on the shores of the Adriatic, Aegean, Black, and Mediterranean Seas (Zschacke 1933–34, Rechinger 1951, Orange 2012). It is common in the Adriatic and Aegean Seas where it forms the so-called "black band" on seashore rocks (Rechinger 1951). In Turkey, it grows mostly on intertidal siliceous rocks on the Black Sea shoreline. This is the first report of the species from Asia.

Hydropunctaria adriatica differs from *H. maura* usually by its thinner thallus, lack of a dark basal layer, and exciple unpigmented below (Zschacke 1933–3), Orange 2012).

Verrucaria elaeina Borrer, in Smith & Sowerby, Engl. Bot. 35: t.2455 f.2. 1813. Fig. 3

Thallus epilithic, continuous, smooth, pale green-brown, rimose. Perithecia numerous, one-quarter to three-quarters immersed in the thallus, but depth varies in the same samples, forming low to moderate projections 0.2–0.4 µm in diam. Involucrellum well-developed, hemispherical to conical, dark reddish-brown. Ascospores ellipsoid-oblong or ellipsoid to narrowly ellipsoid, 15–20 × 6.5–8 µm. Conidiomata not observed. Thallus C–, K–, KC–, PD–.

Specimens examined: **TURKEY. Giresun:** Piraziz, Aydere village, 40°56′33″N 38°06′46″E, 156 m, on siliceous rock, 30 March 2006, leg. K.Kınalıoğlu, det. A. Orange (GUB 2389); Trabzon: Araklı, Konakönü place, sea shore, 40°57′17″N 40°02′56″E, 3 m, on siliceous rock, 12 August 2006, leg. K.Kınalıoğlu, det. A. Orange (GUB 2390).

Remarks— Our Turkish collections had perithecial projections of a similar size to those described by Orange (2000) and Smith et al. (2009), which had perithecial projections up to 0.22–0.4 mm. in diam. However, Turkish ascospores are smaller than those in previous descriptions (15–24 × 6–9.5 µm; Orange 2000, Smith et al. 2009). One Turkish specimen differs ecologically in occurring on siliceous rocks on the seashore.

Verrucaria elaeina is a common species occurring on a wide variety of substrata such as shaded sandstone, limestone, calcareous mudstone, concrete, siliceous rock and brick, in woodland or beneath herbaceous vegetation, on vast areas of ground in gardens, on damp walls, by unused railways and on ruined buildings, often on stones embedded in the ground, cliffs, weakly calcareous rock in shade and occasionally beside streams, also on paths, in the British Isles and Europe (Smith et al. 2009, Orange 2000). In Turkey, we collected it from siliceous rocks in moist shady hazelnut gardens and on the seashore. This is the first report of the species from Asia.

The pale grey-green thallus of *Verrucaria elaeina* on shaded rocks is characteristic and often easily recognized by the naked eye. Some poorly developed morphs have a much less distinctive appearance and could be

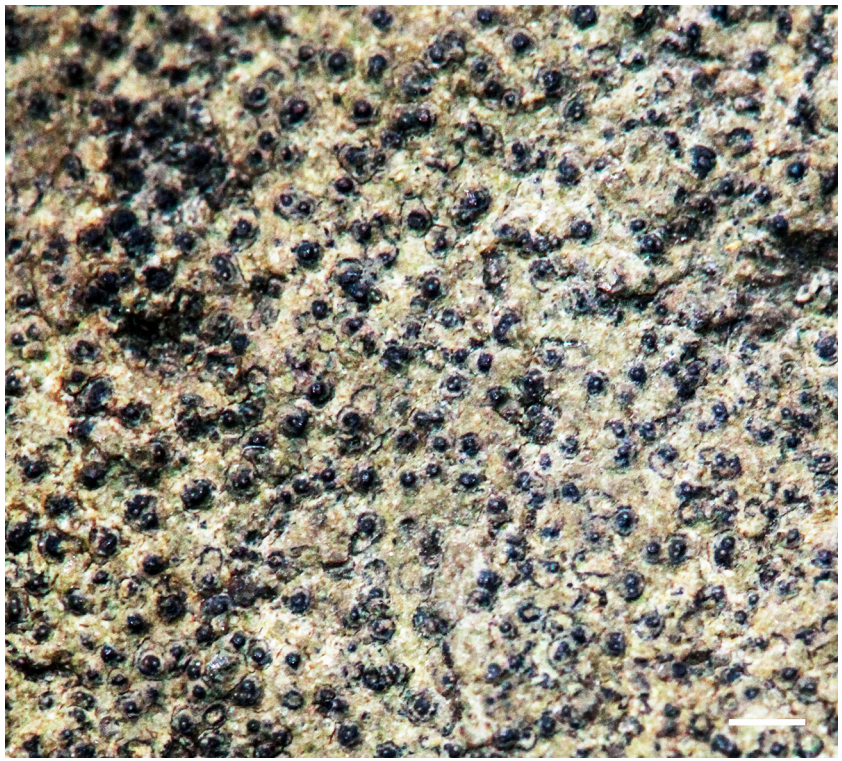

Fig. 3. *Verrucaria elaeina* (GUB 2389): habit. Scale bar = 1 mm.

confused with *V. denudata* or *V. dolosa*. *Verrucaria praetermissa* differs in its thicker thallus, more immersed perithecia, slightly larger ascospores, and its typically freshwater habitat (Smith et al. 2009).

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